



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/756,762

01/14/2004

Paul Anthony Gilkerson

550-508

1521

23117

7590

06/25/2007

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER

LAI, VINCENT

ART UNIT

PAPER NUMBER

2181

MAIL DATE

DELIVERY MODE

06/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/756,762

Applicant(s)

GILKERSON, PAUL ANTHONY

Examiner

Vincent Lai

Art Unit

2181

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-9 and 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-9 and 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's Request for Reconsideration of the finality of the rejection mailed 17 October 2006 is persuasive and, therefore, the finality of that action is withdrawn. Consequently, per MPEP 706.07(e), the Applicant's After-Final Amendment filed 17 January 2007 has been entered and considered by the Examiner. Claims 2, 3, 6-9, 11, 12, and 15-18 have been amended and claims 1 and 10 have been cancelled. At this point, claims 2-9, and 11-20 are ready for examination by the Examiner.

As previously indicated in the Advisory Action mailed out 7 February 2007 and in the Interview Summary sheet mailed out 20 February 2007, the 35 USC 101 rejections are withdrawn after considering previous amendments.

Response to Arguments

2. Applicant's arguments with respect to claims 2-9, and 11-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 2, 3, 7-9, 11, 12, and 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Brewer (U.S. Patent # 4,884,244).

[Examiner's Note: The claims appear out of order in the following rejection. Claim 19 is the first claim to be rejected since this claim is now meant to be an independent claim.]

As per **claim 19**, Brewer discloses a data processing apparatus, comprising:
a processor operable to execute instructions (See column 5, lines 1-11: The processor executes instructions);
a prefetch unit (See column 4, lines 61-68: Prefetching is done with microinstructions) operable to prefetch instructions from a memory prior to sending those instructions to the processor for execution (See column 4, lines 61-68: A location in memory is provided when prefetching), the prefetch unit being operable to determine for a prefetched instruction whether that prefetched instruction is an instruction flow changing instruction (See column 5, lines 12-19: Branches are recognized after prefetching), and based thereon to determine a fetch address for a next instruction to be prefetched by the prefetch unit (See column 5, lines 12-19: The address of the next prefetch is placed on a line to be prefetched);
a return stack accessible by the prefetch unit and operable to hold at least one address (See column 6, lines 18-29: The address prefetched can come from a stack 315); and

prediction logic operable, if the prefetched instruction is a conditional instruction, for predicting whether that prefetched instruction will be executed by the processor (See column 3, lines 26-30 and column 4, lines 41-53: Predictions and assumptions are equated by Brewer and there is prediction/assumption schemes that are taken), the prefetch unit being operable to determine the fetch address dependent on the prediction from the prediction logic (See column 5, lines 12-19: Branches are recognized after prefetching and address are computed from the branch instructions accordingly);

wherein, in the event that the prefetched instruction is a first type of instruction flow changing instruction and is conditional (See column 4, lines 41-53: Table 1 shows a certain conditional branch which is always assumed taken), and the prediction logic predicts that that prefetched instruction will be executed, the prefetch unit for determining as the fetch address an address obtained from the return stack (See column 6, lines 18-29: The address prefetched can come from a stack 315).

wherein the first type of instruction flow changing instruction is a conditional procedure return instruction operable when executed to cause the processor to return from a procedure being executed by the processor (See column 5, lines 65-67: Conditional returns are taught by Brewer).

As per **claim 2**, Brewer discloses wherein the first type of instruction flow changing instruction is a procedure return instruction operable when executed to cause the processor to return from a procedure being executed by the processor (See column 5, lines 65-67: Conditional returns are taught by Brewer).

As per **claim 3**, Brewer discloses wherein if the prefetch unit determines that the prefetched instruction is a second type of instruction flow changing instruction (See column 5, lines 65-67: Different types of instruction flow changing instructions are taught), the prefetch unit is further operable to determine a return address (See column 5, lines 12-19: Branches are recognized after prefetching and address are computed from the branch instructions accordingly) and to cause that return address to be placed on the return stack (See column 6, lines 36-40: Returns are placed in stacks).

As per **claim 7**, Brewer discloses wherein said prediction logic is provided within said prefetch unit (See column 5, lines 1-11: After a prefetch, a determination of what is to be done is made and thus prediction logic must be associated with prefetch).

As per **claim 8**, Brewer discloses wherein said return stack is provided within said prefetch unit (See column 6, lines 18-29: The address prefetched can come from a stack 315).

As per **claim 9**, Brewer discloses wherein said prefetch unit comprises decode logic operable to determine for the prefetched instruction whether that prefetched instruction is an instruction flow changing instruction (See column 5, lines 12-19: Branches are recognized after prefetching), and control logic operable in response to the decode logic to determine the fetch address for the next instruction to be prefetched

Art Unit: 2181

by the prefetch unit (See column 5, lines 1-11: After a decode is necessary to determine the next prefetch).

Claims 11, 12, and 16-20 are rejected for reasons similar to the rejections of claims 2, 3, 7-9, and 19, respectively. Claims 11, 12, and 16-20 are the method claims used with the apparatus claims of claims 2, 3, 7-9, and 19, respectively.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4-6, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brewer in view of McMahan (U.S. Patent # 5,692,168).

As per **claim 4**, Brewer does not teach a branch with link instruction.

McMahan teaches wherein said second type of instruction flow changing instruction is a branch with link instruction (See column 12, lines 28-31: Branches are 1 of 2 types of flow changes), which is operable to identify a start address for a procedure to be executed by the processor (See column 12, lines 42-44: A predicted branch supplies a target address), upon returning from the procedure the next instruction to be

Art Unit: 2181

executed by the processor being specified by the return address (See column 31, lines 21-27: A return address is stored in the stack).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Brewer to include a branch with link instruction. Branch with link instructions are well known and have been used in the art. Brewer teaches only types of branches (See column 5, lines 65-67) and does not go into specificity of what types of branches are actually implemented. One having ordinary skill in the art, would implement specific branch instructions that are taught generally by Brewer and thus would include a branch with link instruction.

As per **claim 5**, Brewer does not teach a branch with link instruction.

McMahan teaches wherein the procedure is returned from by execution of one of said first type of instruction flow changing instructions (See column 31, lines 3-12: A return address is popped off the stack when a return this in the target cache).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Brewer to include a branch with link instruction. Branch with link instructions are well known and have been used in the art. Brewer teaches only types of branches (See column 5, lines 65-67) and does not go into specificity of what types of branches are actually implemented. One having ordinary skill in the art, would implement specific branch instructions that are taught generally by Brewer and thus would include a branch with link instruction.

As per **claim 6**, Brewer does not teach prediction based on history information.

McMahan discloses wherein said prediction logic is a dynamic prediction logic which is operable to provide a prediction as to whether the prefetched instruction will be executed by the processor dependent upon history information identifying an outcome of conditional instructions previously executed by the processor (See column 12, lines 32-26: History is used in branch prediction).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Brewer to include prediction based on history information. Brewer already teaches that various mechanisms are used for predicting the outcome of conditional branches (See column 3, lines 14-25), and one having ordinary skill in the art would appreciate that the use of history for branch prediction is well known and thus it would be obvious to include the use of history for branch predictions to be used with the invention of Brewer.

Claims 13-15 are rejected for reasons similar to the rejections of claims 4-6, respectively. Claims 13-15 are the method claims used with the apparatus claims of claims 4-6, respectively.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent Lai whose telephone number is (571) 272-6749. The examiner can normally be reached on M-F 8:00-5:30 (First BiWeek Friday Off).

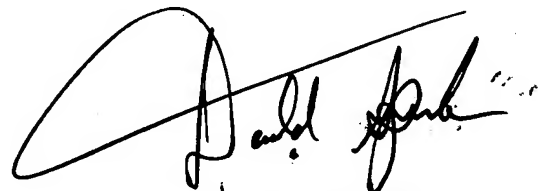
Art Unit: 2181

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vincent Lai
Examiner
Art Unit 2181

vl
June 14, 2007

A handwritten signature in black ink, appearing to read 'Donald Sparks', is written over a horizontal line.

DONALD SPARKS
SUPERVISORY PATENT EXAMINER